

GDAS+NLDAS combined forcing in LIS5 ...

[jonc](#) 33 posts since

Sep 20, 2007

Here's my first attempt at posting to the modeling guru discussion page.

I'd like to post a discussion topic about my attempt to implement NLDAS supplemental forcing in LIS version 5.

I have followed much of the same code modification strategies that I did with LIS v4.3 in implementing the NLDAS supforcing.

So far, I have basically commented out instances of NLDAS in the baseforcing in the plugins and Filepath, and copied the entire NLDAS directory into the supforcing directory.

I modified several files in the supforcing/nldas directory so that it uses supforcing arrays and not primary forcing arrays. For each variable, I'm checking to see whether the NLDAS arrays at both times are non-missing. If so, then I'm overwriting the forcing data at that particular grid point.

For precipitation, I only check to see that the NLDAS data at time2 is non-missing.

The code changes have compiled and the modified LIS runs without crashing, and the lisdiag output indicates that the GDAS files are first opened, then the NLDAS files are opened each hour. I have also confirmed that (at least with the temperature) the code gets into my "IF check" for non-missing NLDAS data in the tinterp file. The problem is that when I compare the GDAS-only run with the GDAS+NLDAS run, the forcing variable statistics are all identical except for precipitation. The precipitation forcing is the only one that has different stats, suggesting that it is over-writing the GDAS forcing with NLDAS forcing for this variable, but not the others.

Any suggestions from the LIS experts are welcome! My modified LIS code is located at /discover/nobackup/jonc/LIS_WRF/WRF/lis5/.

-Jonathan Case Tags: lis, supforcing, gdas+nldas

[sujoy](#) 118 posts since

Sep 20, 2007 1. Re: **GDAS+NLDAS combined forcing in LIS5** Apr 16, 2008 12:00 PM

Jon,

After further looking at the code, it might have to do with the following style of if checks.

In time_interp_nldas.F90, the precip is set as :

```
IF ( nldas_struc(n)%suppdata2(8,index).ne.lis%undef ) THEN
pcp(t)=nldas_struc(n)%suppdata2(8,index)/(60.0*60.0)
ENDIF
```

whereas the other variables are set as:

```
IF ( (nldas_struc(n)%suppdata1(4,index).ne.lis%undef).and. &
(nldas_struc(n)%suppdata2(4,index).ne.lis%undef) ) THEN
lwd(t) =nldas_struc(n)%suppdata1(4,index)*wt1+ &
nldas_struc(n)%suppdata2(4,index)*wt2
ENDIF
```

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So it is possible that your 'suppdata1' arrays are not reinitialized to undefined and as a result, the new values are not assigned.

-Sujoy

[junc](#) 33 posts since

Sep 20, 2007 2. **Re: GDAS+NLDAS combined forcing in LIS5** Apr 16, 2008 12:00 PM

I'd like to add a follow-up to my first post.

(1) I made output every 30min to compare the output statistics in the NOAHstats files. I noticed that the forcing variables ARE different at 30min, but then all variables (except for precip and snow forcing) are identical at all subsequent times after 30min.

(2) The precip forcing is always identical at the top of every hour, but at the off-hour times (30min past), the precip forcing differs.

So, it appears that the NLDAS supplemental forcing only works for all variables in the first hour. After that, only precip forcing over-rides the GDAS forcing but only at off-hour times it appears.

Perhaps this additional evidence could help us diagnose the problem with my modified code.

Jonathan Case

[junc](#) 33 posts since

Sep 20, 2007 3. **Re: GDAS+NLDAS combined forcing in LIS5** Apr 16, 2008 1:49 PM

in response to: [sujoy](#)

Sujoy -- I think I may have found the problem. I'm just confused why I ever put this piece of code in the getnldas.F90 file, because I didn't have it in the code from LIS 4.3! Sometimes, I wonder about myself.....

Here is the suspected code (which I'll test shortly):

! J.Case, ENSCO Inc. (4/10/2008) -- Initialize NLDAS data to missing everywhere.

```
nldas_struct(n)%suppdata2 = lis%undef
```

It's essentially always setting the suppdata2 array to missing prior to resetting the suppdata1 array to suppdata2 if movetime is set to "1".

[junc](#) 33 posts since

Sep 20, 2007 4. **Re: GDAS+NLDAS combined forcing in LIS5** Apr 16, 2008 2:21 PM

in response to: [junc](#)

OK, the GDAS_NLDAS is WORKING now! Hooray.

Sujoy -- I appreciate you suggesting that problem in your post. That helped me identify the erroneous code I had in getnldas.F90.

All is well,

Jon

[sujoy](#) 118 posts since

Sep 20, 2007 5. **Re: GDAS+NLDAS combined forcing in LIS5** Apr 16, 2008 2:25 PM

in response to: [jonc](#) Good to know. Once you are done with the testing, lets get this back in the LIS trunk. That way you won't have to go through this exercise the next time around. Also, please give us a small testcase that we can maintain.

Thanks,
-Sujay

[zaitchik](#) 2 posts since

Sep 20, 2007 6. **Re: GDAS+NLDAS combined forcing in LIS5** May 6, 2008 5:51 PM

in response to: [sujay](#)

Hi Jon and Sujay,

I was just about to start on this same task. Has a version of the GDAS+NLDAS code been integrated to the LIS archive?

If not, then Jon--would you be willing to share your modified code? It would be much appreciated!

Thanks,
Ben

[sujay](#) 118 posts since

Sep 20, 2007 7. **Re: GDAS+NLDAS combined forcing in LIS5** May 6, 2008 6:19 PM

in response to: [zaitchik](#) Ben,

Jon probably is out of the office (his baby is due...) these days. I think it will be good to get his implementation integrated in LIS. In fact, it might make sense to implement NLDAS forcings as supplementals so that it can be used to superimpose a **global** forcing.

-S

[jonc](#) 33 posts since

Sep 20, 2007 8. **Re: GDAS+NLDAS combined forcing in LIS5** May 7, 2008 1:18 PM

in response to: [zaitchik](#)

Hi Ben and Sujay,

I have implemented an iteration of the GDAS+NLDAS forcing and it was functioning the way I wanted it to. However, due to limitations in the NLDAS precipitation fields, I need to implement a CONUS mask so that NLDAS is applied only within the CONUS boundaries. The precip forcing is not valid in Canada and Mexico, and my test domain extended into both these areas.

I probably won't get to the CONUS mask implementaton until June because I first want to work on implementing a GDAS terrain elevation correction for the Lambert projection. That will probably be an easier implementation compared to the CONUS mask for NLDAS suppforsing.

I can certainly provide the code once I have it done.

Finally, we had our baby boy on May 1st (Ethaniel H. Case). I won't be consistently working until ~20 May.

Regards,

GDAS+NLDAS combined forcing in LIS5 ...

Jon

[zaitchik](#) 2 posts since

Sep 20, 2007 9. Re: **GDAS+NLDAS combined forcing in LIS5** May 8, 2008 12:09 PM

in response to: [jonc](#)

Thanks Jon.

And congrats on the baby!

Ben